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GRGTEST

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Test Report

Verified code: 705942

Report No.: E20240725192701-17

Customer: Lumi United Technology Co., Ltd

Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

Sample Name: Voice Mate H1

Sample Model: AT-R01E

Receive Sample Date: Aug.05,2024

Test Date: Aug.24,2024 ~ Aug.26,2024

Reference Document: AS/NZS CISPR 32:2015 Electromagnetic compatibility of multimedia equipment —Emission Requirements

Test Result: Pass

Prepared by:

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Reviewed by:

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GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2024-09-13

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20240725192701-17	Original Issue	2024-09-05

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1. TEST RESULT SUMMARY

Emissions

Test Item	Test mode	Equipment test requirement	Test Method	Class / Severity	Test Result
Radiated Emission	Mode 1,2	AS/NZS CISPR 32:2015 C.3.4	AS/NZS CISPR 32:2015 C.3.4 Table A.4 Class B Table A.5 Class B	Table A.4 Class B Table A.5 Class B	PASS
Conducted Emission	/	AS/NZS CISPR 32:2015	AS/NZS CISPR 32:2015 C.3.5	Table A.10 Class B	Not Applicable ¹

Note 1: The EUT is power by battery, not applicable.

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2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name: Lumi United Technology Co., Ltd
Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.2 MANUFACTURER

Name: Lumi United Technology Co., Ltd
Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Product Name: Voice Mate H1
Product Model: AT-R01E
Trade Name: Aqara
Additional Model: AT-R01D
Model difference descriptions: They have the same software and hardware constructions including circuit diagram, PCB layout and electrical parts, except Model name and packaging are different, as they would distribute in different regions to satisfy subdividing market demands.
Power Supply: 3.0V DC supplied by button cell
Battery Specification: CR2450 3.0V DC
Frequency Range: 2402MHz-2480MHz
Sample submitting way: Provided by customer Sampling
Sample No: E20240725192701-0004
Note 1: The EUT antenna gain is provided by the applicant. This report is made solely on the basis of such data and/or information. We accept no responsibility for the authenticity and completeness of the above data and information and the validity of the results and/or conclusions.
Note 2: The EUT have two colors, the one is white, the other is black, they have the same software and hardware constructions including circuit diagram, PCB layout and electrical parts, except color is different. All tests were performed on the AT-R01E model.

2.4 TEST MODE

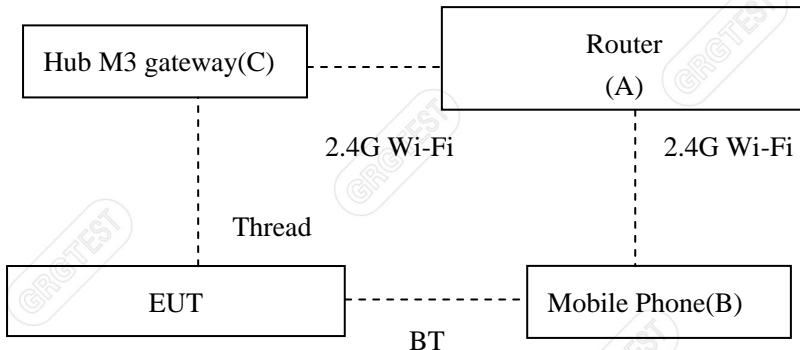
Mode No.	Description of the modes
Mode 1	Test that the peripheral mobile phone is connected to the router through Wi-Fi-2.4G, connect the EUT to the mobile phone's APP through bluetooth, the EUT link to the Hub M3 gateway through Thread, the Hub M3 gateway link to the router through Wi-Fi-2.4G, then use APP software to enable the EUT communication with Hub M3 gateway and click the APP software make the EUT in voice control mode.
Mode 2	EUT standby.

2.5 LOCAL SUPPORTIVE INSTRUMENTS

No.	Name of Equipment	Manufacturer	Model	Serial Number	Note
A	Router(A)	INNBOX	SBB1177HO	/	/
B	Mobile Phone	VIVO	VIVO Y79	/	/
C	Hub M3 gateway	Aqara	/	/	/
Cable					
/	/	/	/	/	/

2.6 CONFIGURATION OF SYSTEM UNDER TEST

Mode 1:



Mode 2:



3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

Add.: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District
Shenzhen, 518110, People's Republic of China.
P.C.: 518110
Tel : 0755-61180008
Fax: 0755-61180008

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:2017.

China CNAS(L0446)

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4. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Radiated Emission (3m)	30MHz~200MHz(H)	4.3 dB
	200MHz~1000MHz(H)	4.5 dB
	30MHz~200MHz(V)	4.4 dB
	200MHz~1000MHz(V)	4.5 dB
	1GHz~6GHz(H)	4.5 dB
	1GHz~6GHz(V)	4.5 dB

This uncertainty represents an expanded uncertainty factor of $k=2$. This uncertainty represents an expanded uncertainty expressed at approximately the 95%.

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5. LIST OF USED TEST EQUIPMENT AT GRGT

5.1 LIST OF USED TEST EQUIPMENT

Name of equipment	Manufacturer	Model	Serial number	Calibration due
Radiated Emission (Below 1GHz)				
Test software	Tonscend	JS32-RE	/	/
Test Receiver	R&S	ESR26	101758	2024-09-22
Amplifier	SHIRONG ELECTRONIC	DLNA-30M1G-G41	20200928003	2024-10-24
Bi-log Antenna	Schwarzbeck	VULB 9160	VULB9160-3402	2024-10-06
Radiated Emission (Above 1GHz)				
Test software	Tonscend	JS32-RE	/	/
Test Receiver	R&S	ESR26	101758	2024-09-22
Preamplifiers	Tonscend	TAP01018048	AP20E8060075	2025-03-01
Horn antenna	Schwarzbeck	BBHA 9120D	02143	2024-09-23
Preamplifier	SHIRONG ELECTRONIC	DLNA-1G18G-G40	20200928005	2025-07-19

Note: The calibration interval of the test instruments is 12 months.

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6. EMISSION TEST

6.1 RADIATED EMISSION MEASUREMENT (RE)

Test Requirement: AS/NZS CISPR 32:2015

Test Method: EN 55032 /annex A.2

6.1.1 LIMITS

The ancillary equipment shall meet the class B limits given in CENELEC EN 55032 [1], annex A tables A.4 and A.5.

Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz for class B equipment

Frequency range(MHz)	Distance (m)	Bandwidth	Limits (dBuV/m)		
			Peak (PK)	Quasi-peak (QP)	Average (Avg)
30~230	3	120kHz	/	40	/
230~1000	3	120kHz	/	47	/

Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for class B equipment

Frequency range(MHz)	Distance (m)	Bandwidth	Limits (dBuV/m)		
			Peak (PK)	Quasi-peak (QP)	Average (Avg)
1000~3000	3	1MHz	70	/	50
3000~6000	3	1MHz	74	/	54

6.1.2 TEST PROCEDURE

(1) Procedure of Preliminary Test

Radiated emission tests shall be made with the receive or transmit antenna located at a horizontal distance of 3m plus half of the maximum width of the EUT being tested, measured from the centre of the EUT. The tests shall be performed with the equipment configured as closely as possible to its typical, practical operation. Unless stated otherwise, cables and wiring shall be as specified by the manufacturer and the equipment shall be in its housing (or cabinet) with all covers and access panels in place. Any deviation from normal EUT operating conditions shall be included in the test report.

The EUT (on a non-conductive support structure, where applicable) shall be placed on a remotely operated turntable, to allow the EUT to be rotated. The height of the EUT above the ground plane shall be according to the following requirements.

-- Table-top equipment is placed on a non-conductive set-up table with height $0.8\text{ m} \pm 0.01\text{ m}$, CISPR 16-1-4 specifies the method to determine the impact of the non-conductive set-up table on test results.

-- Floor-standing equipment is placed on a non-conductive support, as specified in the applicable product standard. If there are no EUT height placement requirements in the product standard, the EUT shall be placed on a non-conductive support at a height of 5 cm to 15 cm above the ground plane.

Note: This is table-top equipment.

Interface cables, loads, and devices should be connected to at least one of each type of the interface ports of the EUT and, where practical, each cable shall be terminated in a device typical for its actual use. Where there are multiple interface ports of the same type, a typical number of these devices shall be connected to devices or loads. It is sufficient to connect only one of the loads, provided that it can be shown, for example by preliminary testing, that the connection of further ports would not significantly increase the level of disturbance (that is, more than 2 dB) or significantly degrade the immunity level.

The test mode(s) were scanned during the preliminary test. After the preliminary scan, we found the test mode producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

(2) Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test. The Analyzer/ Receiver scanned from 30MHz to 1000MHz and 1000MHz to 6000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level. Record at least six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and for 30MHz~1000MHz only QP reading is presented, for 1000MHz~6000 MHz Peak and AVG reading is presented.

6.1.3 TEST SETUP

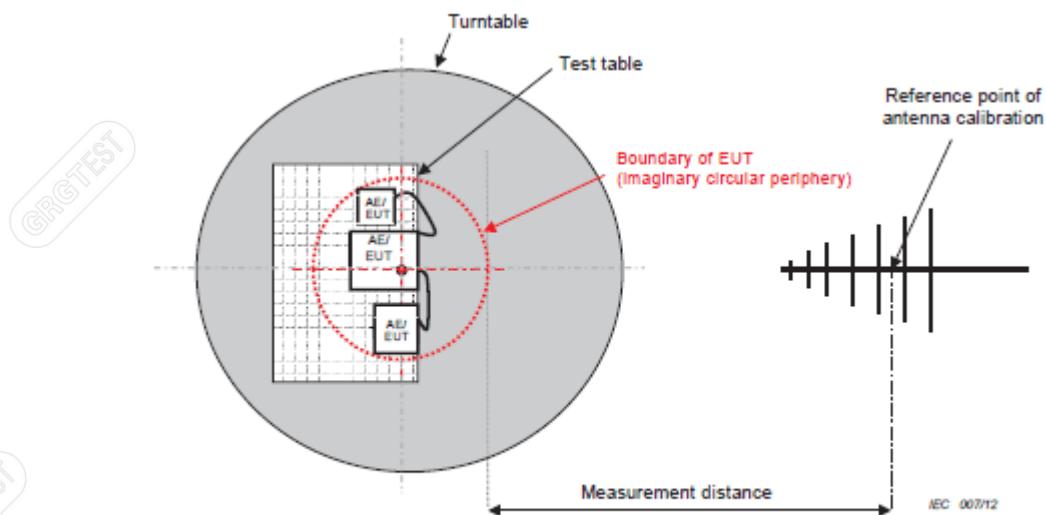


Figure C.1 – Measurement distance

Below the frequency of 1GHz

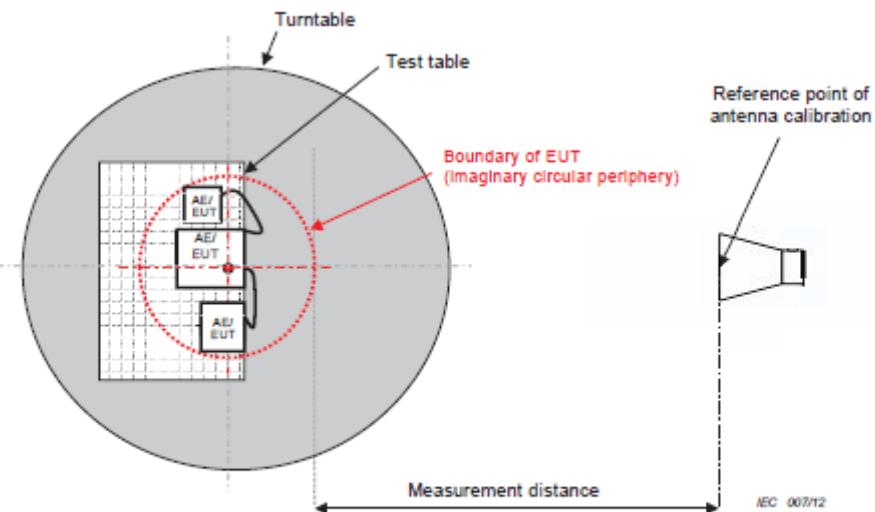


Figure C.1 – Measurement distance

Above the frequency of 1GHz(1GHz-6GHz)

6.1.4 DATA SAMPLE

Below 1GHz

NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity	Verdict
xxx	86.5096	67.55	33.83	-33.72	40.00	6.17	QP	200	118	Horizontal	PASS

Frequency (MHz) = Emission frequency in MHz

Reading (dB μ V) = Uncorrected Analyzer / Receiver reading

Factor (dB) = Antenna factor + Cable loss – Amplifier gain

Level (dB μ V/m) = Reading (dB μ V) + Factor (dB)Limit (dB μ V/m) = Limit stated in standardMargin (dB) = Limit (dB μ V/m) - Level (dB μ V/m)

QP = Quasi-peak Reading

Above 1GHz

Suspected Data List

NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
xxx	xxx	49.54	40.49	-9.05	74.00	33.51	100	256	Horizontal

Frequency (MHz) = Emission frequency in MHz

Reading (dB μ V/m) = Uncorrected Analyzer / Receiver reading

Factor (dB) = Antenna factor + Cable loss – Amplifier gain

Level for 1m (dB μ V/m) = Reading (dB μ V/m) + Factor (dB)

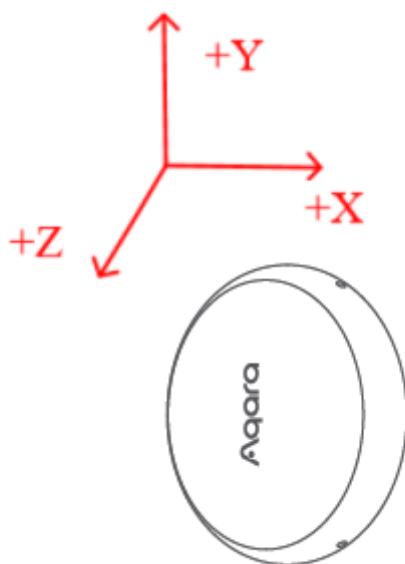
Level for 3m (dB μ V/m)	= Level for 1m (dB μ V/m) + 20*log(1/3)
Limit (dB μ V/m)	= Limit stated in standard
Margin (dB)	= Limit (dB μ V/m) – Level (dB μ V/m)
Polarity	= Antenna polarization
Peak	= Peak Reading
AVG	= Average Reading

6.1.5 PHOTOGRAPH OF THE TEST ARRANGEMENT

Please refer to the attached document E20240725192701-CE AUS-Test Photo.

6.1.6 TEST RESULTS

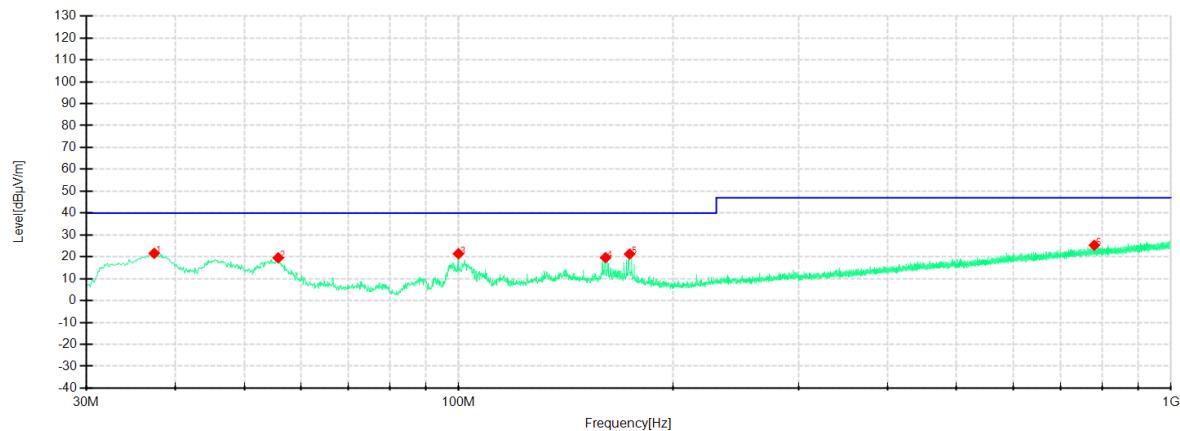
The test are under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the Z position. So the data shown the Z position only.



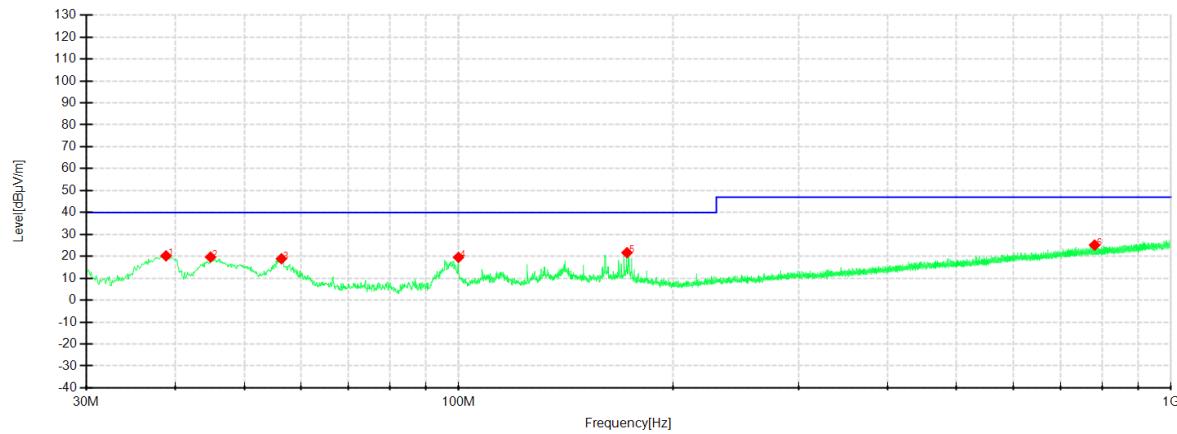
Pretest all case, only the worst case mode 1 test results were recorded in this report.

Below 1GHz

Environmental Conditions	24.3°C/64%RH/101.0 kPa	Test Mode	Mode 1
Power supply	DC 3V	Tested By	Wen wenwen
Test Date	2024-08-24	/	/



NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity	Verdict
1	37.3720	51.08	21.61	-29.47	40.00	18.39	QP	100	248	Horizontal	PASS
2	55.8020	48.77	19.54	-29.23	40.00	20.46	QP	100	77	Horizontal	PASS
3	99.9370	53.38	21.42	-31.96	40.00	18.58	QP	100	92	Horizontal	PASS
4	160.7560	47.94	19.64	-28.30	40.00	20.36	QP	100	20	Horizontal	PASS
5	173.7540	50.63	21.27	-29.36	40.00	18.73	QP	200	141	Horizontal	PASS
6	780.4890	42.26	25.28	-16.98	47.00	21.72	QP	200	297	Horizontal	PASS

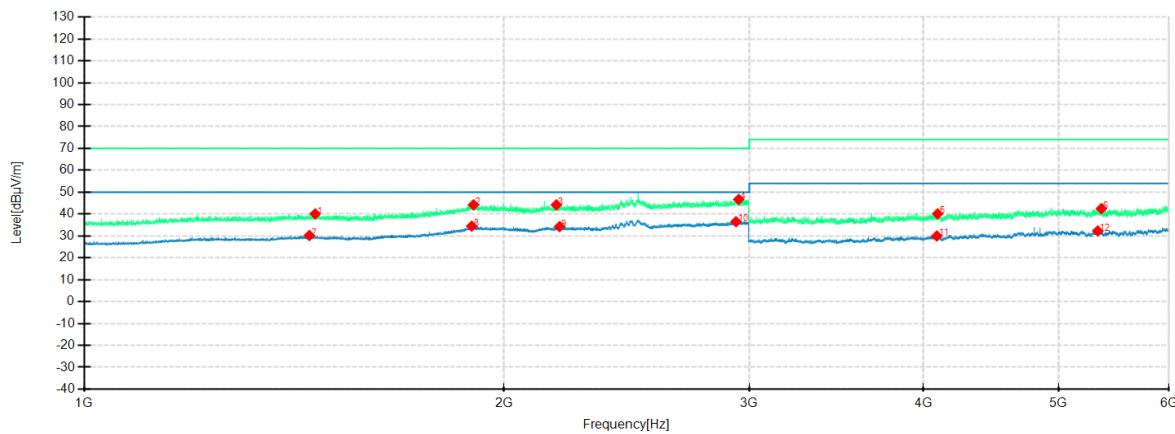


NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity	Verdict
1	38.8270	49.60	20.22	-29.38	40.00	19.78	QP	100	257	Vertical	PASS
2	44.8410	48.74	19.66	-29.08	40.00	20.34	QP	200	358	Vertical	PASS
3	56.3840	48.19	18.92	-29.27	40.00	21.08	QP	100	340	Vertical	PASS
4	99.9370	51.49	19.53	-31.96	40.00	20.47	QP	100	312	Vertical	PASS
5	172.2990	50.87	21.67	-29.20	40.00	18.33	QP	200	302	Vertical	PASS
6	781.1680	42.11	25.14	-16.97	47.00	21.86	QP	200	302	Vertical	PASS

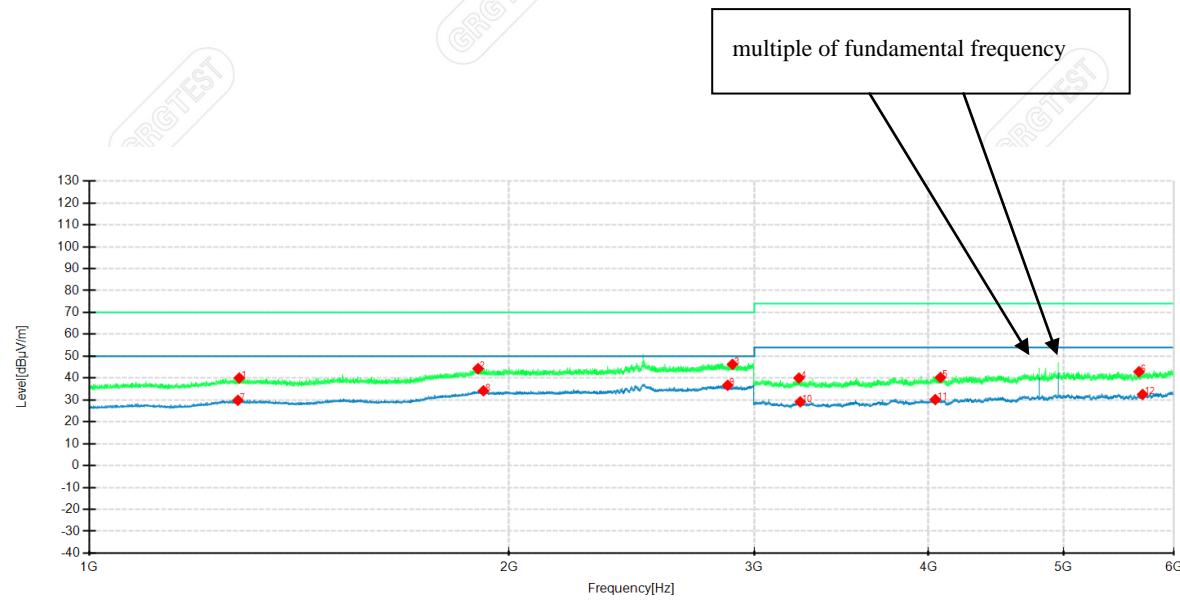
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Above 1GHz

Environmental Conditions	24.2°C/60%RH/101.0 kPa	Test Mode	Mode 1
Power supply	DC 3V	Tested By	Wen wenwen
Test Date	2024-08-26	/	/

**Suspected Data List**

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1464.4000	48.05	40.09	-7.96	70.00	29.91	200	85	Horizontal
2	1902.0000	47.81	44.21	-3.60	70.00	25.79	200	258	Horizontal
3	2181.2000	48.01	44.22	-3.79	70.00	25.78	200	321	Horizontal
4	2947.6000	47.36	46.69	-0.67	70.00	23.31	200	37	Horizontal
5	4094.7000	50.22	40.13	-10.09	74.00	33.87	100	120	Horizontal
6	5366.1000	48.28	42.50	-5.78	74.00	31.50	200	134	Horizontal
7	1450.4000	38.06	30.18	-7.88	50.00	19.82	200	180	Horizontal
8	1896.6000	38.14	34.47	-3.67	50.00	15.53	100	263	Horizontal
9	2192.6000	38.06	34.26	-3.80	50.00	15.74	200	85	Horizontal
10	2934.6000	37.33	36.50	-0.83	50.00	13.50	200	69	Horizontal
11	4088.7000	40.17	30.00	-10.17	54.00	24.00	200	118	Horizontal
12	5333.7000	38.03	32.30	-5.73	54.00	21.70	100	21	Horizontal



Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1281.2000	47.97	40.02	-7.95	70.00	29.98	100	260	Vertical
2	1900.8000	47.98	44.30	-3.68	70.00	25.70	100	130	Vertical
3	2893.6000	47.50	46.27	-1.23	70.00	23.73	200	72	Vertical
4	3229.5000	52.54	39.99	-12.55	74.00	34.01	200	53	Vertical
5	4079.7000	50.44	40.26	-10.18	74.00	33.74	100	67	Vertical
6	5663.1000	47.67	42.88	-4.79	74.00	31.12	100	163	Vertical
7	1278.4000	37.79	29.83	-7.96	50.00	20.17	100	196	Vertical
8	1917.8000	38.00	34.18	-3.82	50.00	15.82	200	262	Vertical
9	2870.8000	37.81	36.69	-1.12	50.00	13.31	100	5	Vertical
10	3236.4000	41.53	29.13	-12.40	54.00	24.87	200	236	Vertical
11	4045.2000	40.55	30.17	-10.38	54.00	23.83	100	36	Vertical
12	5696.7000	37.57	32.51	-5.06	54.00	21.49	100	242	Vertical

Remark: The fundamental frequency or multiple of fundamental frequency's limit is controlled to the standard of Radio frequency.

APPENDIX A. PHOTOGRAPHS OF EUT

Please refer to the attached document E20240725192701-EUT photo.

----- End of Report -----